

Office Action Summary

Application No.

09/889,862

Applicant(s)

GUIRMAN ET AL.

Examiner

Jeff H. Aftergut

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) 30-40, 46, 47, 53 and 54 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29, 41-45, 48-52 and 55 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

Election/Restrictions

1. Applicant's election of Group I in Paper No. 6 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-9, 11-13, 19, 20, 41-44 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olry et al '217 in view of Olry et al '348.

Olry '2101.7 is discussed in detail in paper no. 5, paragraph 6 and 8. The applicant is referred to the same for a complete discussion of the reference and the processing involved in formation of the "bowl" therein. The reference suggested that one skilled in the art would have laid a "deformable cloth" that has been preneedled with a fiber web upon the supporting tool in the process of making the same. see column 4, lines 6-9. the reference was silent as to whether the deformable fabric was deformed "without forming folds" therein (as argued by applicant). It should be noted that "deformable fabric" would not have been expected to produce folds when placed upon the surface wherein increases in thickness in the fabric material would have been formed. It should be noted that such would have been undesirable in the operation of Olry '217 as such would have made a defective end product. in any event, those skilled in the art of manufacturing carbon carbon composites would have known what was meant by "deformable cloth" and would have selected such materials to include those which did not form folds therein as evidenced by Olry '348.

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Olry '348 suggested that those skilled in the art at the time the invention was made would have incorporated deformable fabric in a carbon carbon composite wherein the fabric was able to deform such that it was capable of being wound in a flat helix without forming thickenings or wrinkles on its surface and with substantial uniform distribution of the fiber in the sheet, column 3, lines 47-54. subsequent to the laydown of the fabric on the former, the adjacent plies were needled together and then subjected to infiltration of a carbon matrix material therein. The fabrics employed were clearly deformable fabrics and clearly were of the same type of deformable fabrics employed by applicant as described in the specification at page 11, lines 8-16, see column 4, lines 54-column 6, line 16, Figures 1, 2, 3A-3C, 4, 5A-5C. the reference to Olry '348 clearly suggested a suitable "deformable fabric" which would have been useful in the operation of Olry '217 which would have been capable of deformation upon the former without increases in thicknesses and/or wrinkles (and as such there would have been no folds in the deformed fabric). It should be noted that the fabrics of Olry '348 are of the same type of deformable fabrics employed by applicant and that the reference to Olry '217 suggested the use of the same. it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the deformable fabrics of Olry '348 as the deformable fabric materials used to make the carbon carbon composite bowls of Olry '217 as such would have facilitated the formation of a bowl which lacked changes in thickness due to folding and/or wrinkling of the fabric during lay up of the fabric on the former.

With regard to claims 2-8, the reference to Olry '348 suggested that one skilled in the art would have known to knit the layers together, stitch the layers together or needle the layers together. The specific deformable fabrics are clearly expressed by Olry '217 as useful in the

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operation. Regarding claim 9, the reference to Olry '217 suggested that one employ carbon fiber and failed to express that a sizing pretreatment was associated with the bare carbon fibers. As such the carbon fibers are believed to be free of surface functions. In any event such is taken as conventional in the art of carbon-carbon composite manufacture. Regarding claims 11 and 12, the reference to Olry '217 clearly suggested the joining of plural plies via a needling operation. Regarding claim 19, the reference to Olry '217 suggested chemical vapor infiltration (deposition). Additionally regarding claim 20, the reference to Olry '217 did not cut slots in the fabric in the deposition but rather employed single plies of deformable material. Regarding the density of the fibers through the thickness of the assembly, one skilled in the art would have expected to have controlled the same in order to attain a uniform end product and such would have been done using the needling arrangement of Olry '217. with regard to claim 55, note that one skilled in the art would have understood that the bowl shape of the composite produced by Olry '217 would have been useful as a bowl for a crucible.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 3 further taken with Shepherd et al (newly cited).

The references as set forth above in paragraph 3 suggested the overall operation, however they failed to address whether one skilled in the art at the time the invention was made would have provided the carbon fibers which were free of sizing (surface functions) thereon. However, as previously noted, the reference to Olry '217 did not express that such sizing materials were present. Additionally, applicant's themselves employed commercially available carbon fibers in the operation. To further evidence that it was notoriously well known to remove the surface function materials from the carbon fibers in the manufacture of a composite, the reference to

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Shepherd et al is cited. Shepherd et al suggested that those skilled in the art at the time the invention was made would have pretreated the fibers of the assembly to remove any surface finishes present on the fibers as described at column 3, lines 29-36 where the removal of the surface treatments on the carbon fibers would have resulted in fibers products which had maximum physical properties. Clearly, in order to maximize the physical properties of the finished assembly, one skilled in the art at the time the invention was made would have incorporated a step of removing the surface sizings from the carbon fibers when making a carbon-carbon composite as suggested by Shepherd et al the use of the same in the process as described above in paragraph 3 would have been obvious to the ordinary artisan.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 3 further taken with Thebault (newly cited).

The references as set forth above in paragraph 3 suggested that those skilled in the art at the time the invention was made would have incorporated carbon fibers for the yarns used in the fabrics, however there is no express teaching of employing carbon fibers which included a pyrolitic carbon coating thereon in the operation. It should be noted that in paper no. 5 such was taken as conventional in the art. The reference to Thebault evidenced that not only was it conventional in the art of composite article manufacture to incorporate carbon fibers which included a pyrolitic coating upon the carbon fibers but that such would have been desirable in composite manufacture as producing a stronger finished composite assembly, see column 1, lines 13-23 and column 1, lines 31-36. Clearly, those skilled in the art of manufacturing carbon-carbon composites would have understood that pyrolitic carbon coated carbon fibers would have provided one with additional benefits in the manufacture of the composites. It would have been

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obvious to one of ordinary skill in the art to employ pyrolitic coated carbon fibers as the reinforcing fibers of the carbon carbon composite as such was well recognized as increasing the strength properties of the finished assembly as taught by Theblaut in the process of making a carbon carbon composite bowl as taught by the references as set forth above in paragraph 3.

6. Claims 1-13, 16-20, 25, 26, 41-44, 48-50, and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walsh in view of Olry et al '217 for the same reasons as previously identified in paper no. 5, paragraph 8 further in view of Olry et al '348.

The references to Olry et al '217 and Walsh are discussed in detail above. The reference to Olry et al '348 is discussed at length above and one skilled in the art would have understood to utilize deformable fabric for the operation for the reasons identified above. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the processing of Olry '217 to form the bowl in Walsh as such would have provided a simplified means for manufacturing a complex shape wherein one employed the deformable fabrics of Olry '348 in the operation to ensure that uniformity in thickness was achieved. For a complete discussion of Olry '348, the applicant is referred to the portions above.

With regard to newly added claim 55, note that Walsh suggested the specified bowl shape for use as a crucible.

7. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth either in paragraph 3 or 6 above further taken with Monget et al and Cahuzac for the same reasons as expressed in paper no. 5, paragraph 9.

While the references as set forth above in paragraphs 3 or 6 suggested assembling the plies together via needling, those skilled in the art at the time the invention was made would

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have readily appreciated that other techniques would have been useful for attachment of the plies together including implantation of fibers and stitching as evidenced by Monget et al and Cahuzac and the use of these well known alternatives would have been within the purview of one of ordinary skill in the art at the time the invention was made.

8. Claims 21-24, 28, 29, 45, 51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 6 further taken with E.P. 913,504 and Soviet Union Patent 1699755 for the same reasons as expressed in paper no. 5, paragraph 11 and 13.

9. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 6 further taken with E.P. 913,504 further taken with any one of Metter et al, Kondo et al or Holcombe et al for the same reasons as expressed in paper no. 5, paragraph 12.

Response to Arguments

10. Applicant's arguments with respect to claims 1-29, 41-45, 48-52 and 55 have been considered but are moot in view of the new ground(s) of rejection.

The applicant argues that the claimed deformable fabric were capable of deformation such that they did not result in any changes in thickness in the finished assembly when one applied the fabrics upon the former. The applicant argues that the reference to Olry '217 failed to teach the use of this type of deformable fabric by failing to expressly recite deforming without forming folds as claimed. The applicant is advised that the reference to Olry '217 did suggest that those skilled in the art at the time the invention was made would have included the use of fabrics which were deformable for the plies of material employed to make the bowls, see above.

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While the reference was silent as to the type of deformable fabrics employed, one skilled in the art would have been expected to utilize a deformable fabric which was used in a similar process such as the deformable fabrics of Olry '348. the fabrics of Olry '348 are deformable and are needed to join the plies of material together. The deformable plies therein were additionally capable of deformation such that no changes in thickness resulted (i.e. a lack of folding) and uniform fiber arrangements were attained. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the fabrics of Olry '348 in the operation of Olry '217 to form a composite bowl.

Regarding dependent claim 9, the newly cited reference to Shepherd clearly suggested the removal of sizing materials in order to remove surface functions from the carbon fibers. It should be noted that applicant's own disclosure suggested that conventional carbon fibers commercially available would have been useful in the process.

Regarding claim 19, chemical vapor deposition is the same as chemical vapor infiltration and there is no deemed patentable difference between infiltrating the reinforcement and depositing the matrix within the reinforcement via chemical vapor techniques. Applicant is requested to identify how "deposition" of Olry '217 is different from the claimed "infiltration" as the difference when looking at the reference as a whole seems only a matter of semantics.

Regarding claim 20, the applicant argues that Olry '217 did not express that there was a lack of cutouts or slots formed in the material. the applicant is advised that the reference did not express a cutting step and had one been deemed necessary, it is believed that such would have been identified by the reference. Additionally, the reference suggested that one skilled in the art

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would have utilized a deformable fabric which is the exact solution that applicant selected to avoid the cutouts.

Regarding Walsh, while the reference does concern itself with the formation of 3-D weaves for making the bowl, one skilled in the art at the time the invention was made would have understood that 3-D fabrics would have been produced any number of ways including lay-up of 2-D plies and needling and/or stitching through the same to provide a 3-D fabric. One skilled in the art additionally would have viewed the techniques of Olry '217 as having been a simple means for forming the reinforcing fabric in a complex shape which was required of the processing to make a composite bowl in Walsh. As such the fabric forming techniques of Olry '217 would have been viewed as a functional equivalent to the fabric forming techniques of Walsh. It is well established that where, as here, two equivalents are interchangeable for their desired function an express suggestion of the desirability of the substitution of one for the other is not needed to render such substitution obvious, see In re Fout, 213 USPQ 532, In re Siebentritt, 152 USPQ 618. here, the fabric forming techniques of Olry '217 would have been viewed as an alternative technique to that of the fabric forming techniques of Walsh and the expression of a desirability to substitute one technique for another is not needed to render such substitution obvious. Additionally, the reference to Olry '217 expressed that the fabric forming techniques described therein provided one with the ability to form complex shapes.

Regarding claim 10, the "notorious character" of the use of pyrolitic carbon on carbon fibers is clearly evidenced by Theblaut. It should be noted that Theblaut is assigned to the same assignee as this application and applicant is advised that the reference evidenced that the

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operation was conventional at the time the invention was made. It is believed that this is adequate "evidence" as requested by applicant.

With regard to the use of Monget and Cahuzac, the applicant argues that these references do not disclose the mesh loops of claim 2, the use of needling with the loops of claims 5 and 42 or the angular relationship of the plies. The applicant is advised that the fabrics employed by applicant as the deformable fabrics were the same deformable fabrics as that of Olry '348 (see the specification at page 11, lines 8-12. the applicant is advised that one skilled in the art would have known to needle the plies together or to stitch or knit the same together in order to secure the layers together in a deformable fabric. Regarding claim 8 and the formation of the deformable plies via knitting, the reference to Olry '348 clearly formed the plies to include a knitting operation for securing the layers together and thus did form deformable fabric via a knitting step.

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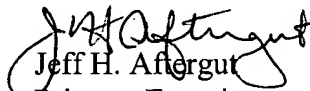
Regarding the rejection which included the references to E.P. '504 and Soviet Union '755, the applicant is advised that the reference to E.P. '504 clearly showed that one skilled in the art would have formed a hole in the composite material used as a bowl. The references to Walsh as modified by Olry '217 and Olry '348 suggested the laminated structure. One viewing the same would have understood that a hole would have been formed in the composite material. additionally, one skilled in the art would have readily appreciated from the Soviet Patent that one would have incorporated the same graphite material as the bowl for the plug. Having said that, it would have been within the purview of the ordinary artisan to utilize the same material (carbon-carbon reinforced composite) for the plugs in E.P. '504 as such would have provided the same materials for both layers.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff H. Aftergut whose telephone number is 703-308-2069. The examiner can normally be reached on Monday-Friday 6:30-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael W. Ball can be reached on 703-308-2058. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.


Jeff H. Aftergut
Primary Examiner
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